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Section 7
Site Mitigation Process

I. INTRODUCTION

The remedial phase of an environmental investigation involves activities to eliminate existing or potential contaminant impacts to receptors (human health, human safety, groundwater quality, or the environment).

Once the full extent of contamination has been determined, the elimination of existing or potential contaminant impact to receptors requires the establishment of site-specific cleanup goals based on the following criteria:

- Regulatory standards
- Current or proposed site use
- Existing or potential use of ground and surface water
- Existing or potential contaminant impact to receptors

Remediation can include:

- Remedial (cleanup) activities, or
- Engineering controls (techniques used to eliminate existing or potential contaminant impacts)
- Natural attenuation

A. UST Sites

The California Code of Regulations (CCR), Title 23, Division 3, Chapter 16, Article 11, divides remedial actions into two types for sites with contamination related to underground storage tanks (USTs):

1. Interim Remedial Action

Interim remedial actions are necessary to abate immediate contaminant impacts to receptors, or to control the spread of contamination, and can occur any time during an environmental investigation.

Most common remedial technologies can be used as interim remedial actions (examples include non-aqueous phase liquid [NAPL] removal or excavation of contaminated soil). DEH concurrence is required prior to initiating interim remedial activities. Other regulatory agencies may require permits and/or approvals depending on the technology selected.

2. Corrective Action Plan Implementation

A Corrective Action Plan (CAP) presents a comprehensive summary of the findings of site assessment and characterization activities, identifies existing and potential receptors, proposes site specific cleanup goals, presents a remedial technology feasibility study, and proposes a remedial plan. Before a CAP is implemented, the extent of contamination must be completely assessed, and the contaminant and site must be characterized. CAPs must also undergo a public review period. The elements of a CAP can be reviewed in Article 11, provided in Appendix K. CAP guidelines are also described in Section 7.III.

If the RP is seeking reimbursement from the State UST Cleanup Fund, implementation of the most cost-effective remedial alternative is required.

B. Non-UST Sites

The remediation process for cleanup of non-UST related sites is technically identical to the remediation process for UST related cases. A formal CAP is not required by regulation. However, for consistency DEH may choose this same process for non-UST cases.

C. Remediation Alternatives

Following the review of the comprehensive site assessment report, DEH will decide if site conditions are protective of human health, human safety, groundwater quality, or the environment. If site conditions are not protective of receptors, the submittal of a CAP is required. All appropriate remediation alternatives should be evaluated in the CAP. Remediation alternatives include, but are not limited to:

- NAPL removal
- Soil excavation and off-site disposal
- Soil excavation and on-site treatment
- In situ soil treatment
- Groundwater treatment
- Natural attenuation

II. AGENCY PERMITTING

The following is a list of various agencies involved in the permitting of remediation systems. When considering a remediation approach, contact these agencies to verify their requirements, since they can vary significantly depending on the technology, the waste being treated, and the local laws and regulations. Use the addresses and phone numbers provided in Appendix G, or refer to the local phone book.

- Regional Water Quality Control Boards (RWQCBs)
- San Diego County Air Pollution Control District (APCD)
- Local building /planning departments
- Local sewer agency
- Local storm water programs

- Local fire departments
- Cal-EPA
- Federal EPA, Region 9

III. CORRECTIVE ACTION PLANS

A CAP is a comprehensive approach to remediate the effects of an unauthorized release from a UST system in a cost-effective manner. A CAP is typically developed only after a complete site investigation has been performed. The following discussion outlines the information to be considered and documentation to be submitted by RPs preparing a CAP. RPs or their consultants must be prepared to present their CAP process to the public when necessary.

The complexity of the investigation, assessment, and feasibility study depends, in part, on the type of contaminant(s) and the extent of contamination. RPs and their consultants are advised to work closely with DEH staff throughout the entire CAP process to avoid unnecessary tasks. As always, DEH wants to encourage prompt cleanup. However, situations could exist where RPs and/or their consultants seek to obtain DEH concurrence at each step of the CAP process. DEH will review the proposed CAP and provide concurrence only after concluding that implementation of the CAP will adequately protect public health and safety and the environment, and will restore or protect current or potential beneficial uses of water.

These guidelines have been developed to comply with the UST regulations included in the CCRs, Title 23, Division 3, Chapter 16, Article 11, Sections 2720 and 2725 through 2728, and the California Health and Safety Code, Division 20, Chapter 6.7, Section 25280(b).

For those sites where contamination is not related to a UST and remediation is required, a remedial action plan (RAP) may be needed. At the request of DEH, a RAP is required for sites where significant remedial action is necessary. The RAP should follow the guidance for CAPs presented in this section.

A. Situations Requiring a CAP

A CAP is required when any of the following conditions exist:

1. NAPL is found at the site or in the surrounding area.

2. There is evidence that surface water or groundwater has been or may be affected by the unauthorized release.

3. There is evidence that contaminated soils are or may be in contact with surface water or groundwater.

4. DEH requests a CAP, based on actual or potential adverse effects of contaminated soil or groundwater on nearby surface waters or groundwater resources, or based on the potential risk of fire, explosion, or public exposure to vapors.

B. Contents of a CAP

A CAP includes the following four basic elements, which are listed and then described in more detail below:

- Assessment of impacts
- Determination of applicable cleanup levels
- Feasibility study and corrective action workplan
- Plan to monitor and report the effectiveness of the corrective action

1. Assessment of Impacts

A CAP is based on adequate delineation of contamination. If DEH requests a CAP prior to the completion of a site investigation, the site investigation becomes a part of the CAP and must be completed before the remedial action is undertaken. Previous site assessment reports may be referenced in the CAP.

At a minimum, all of the following information should be included in an "Assessment of Impacts."

a. Hydrologic and Geologic Characteristics of the Site

(1) Indicate the current and potential beneficial uses of groundwater and nearby surface waters as designated by the RWQCB.

(2) Tabulate existing groundwater data for the site. Include existing monitoring well gauging data (e.g., depth to groundwater, groundwater elevation) and well construction details (e.g., total depth, depth to top of screen, screened intervals).

(3) Provide a narrative description of the topographic characteristics in the vicinity of the site (e.g., locations of surface waters, slope of site, drainage patterns and facilities, locations of subdrains, locations of grading work done at the site).

(4) Provide a map that illustrates the items described in (3) above, as well as the location of groundwater recharge zones and groundwater supply wells in the vicinity of the site.

(5) Provide a narrative description of the lithology of the site.

(6) Provide a cross section of the lithologies present at the site.

(7) Provide hydraulic contour maps to illustrate the groundwater flow direction and gradient.

(8) Provide a discussion of the groundwater data in a regional context and in consideration of regional climatic cycles. Discuss any trends or fluctuations observed from season to season, or from year to year.

b. Contaminant Characteristics and their Impacts

(1) Identify the contaminants of concern at the site. Tabulate all existing soil data. Tabulate the existing groundwater data and provide an analysis of trends in contaminant concentrations.

(2) Provide a narrative discussion of the chemical and physical characteristics of the contaminant(s). Discuss each contaminant's toxicity, persistence, and potential for migration through soil, water, and air.

(3) Describe impacts of the contamination at the site to soil, groundwater, surface water, and air. Describe impacts to utilities including water lines, storm drains, electrical and phone lines, etc. Include maps and cross sections depicting the contaminant plume(s). Include maps of all utility lines and indicate their depths.

(4) Describe potential impacts of contamination at the site to soil, groundwater, surface water, and air. Describe potential impacts to utilities including water lines, storm drains, electrical and phone lines, etc. Include maps and cross sections depicting the potentially impacted area(s). Prior to initiating a fate and transport study or risk assessment study, consult with DEH to determine if this level of analysis is necessary.

2. Determination of Applicable Cleanup Levels

Cleanup levels for groundwater, surface water, and soil are performance standards that need to be considered for the feasibility study. Strategies evaluated in the feasibility study should be technically capable of remediating contamination to the established cleanup levels. DEH concurrence with any proposed target cleanup levels must be obtained prior to implementing the corrective action, except as provided in Section 6.III.D. Cleanup levels are determined as follows.

a. Cleanup Levels for Groundwater or Surface Water in Areas with Designated Current or Potential Beneficial Uses

CCR Title 23, Article 11, Section 2725 (g) requires that in areas with designated current or potential beneficial uses of groundwater or surface water, the numerical objectives designated in the San Diego Water Quality Control Plan (as prepared by RWQCB) for any particular contaminant will constitute the Maximum Contaminant Level (MCL) for that contaminant in groundwater and surface water. In general, the numerical objectives (MCLs) will be adopted as specified in CCR Title 22, Chapter 15, Article 5.5, Section 64444.5, Table 5.

There are chemical compounds that have no numerical objective designated in the Water Quality Control Plans for either the San Diego Basin or the Colorado River Basin. The RP shall then propose target cleanup levels for groundwater and surface water that are consistent with the narrative of the Water Quality Control Plans for the San Diego Basin and the Colorado River Basin (see "Groundwater Cleanup Levels" section in the Water Quality Control Plan), and that are based on the information presented in Section 6.II.A. Proposed target cleanup levels are typically based on risks to public health and safety. Potential vapor migration of contaminants should be taken into account.

b. Cleanup Levels for Groundwater or Surface Water in Areas with No Designated Current or Potential Beneficial Uses (Non-Beneficial Use Areas)

In an area with no designated current or potential beneficial uses for groundwater or surface water (i.e., non-beneficial use areas), the RP shall propose target cleanup levels for groundwater and surface water. The target cleanup levels should be based on the information presented in Section 6.II.B. Proposed target cleanup levels are typically based on risks to public health and safety. Potential vapor migration of contaminants should also be taken into account.

When the RP or DEH is aware that water in a non-beneficial use area is in fact being used, cleanup levels for groundwater and surface water are as outlined in Section 6.II.A.

c. Cleanup Levels for Soil

The RP shall also propose soil cleanup levels. The target soil cleanup levels must ensure that remaining leachable/mobile constituents of concern do not threaten to cause groundwater or surface water to exceed applicable (water) target cleanup levels. The target soil cleanup levels must ensure that remaining constituents of concern do not threaten public health through exposure to soil vapors or the soil itself. The target soil cleanup levels must also ensure that remaining constituents of concern do not create fire or explosion hazards.

3. Feasibility Study and Corrective Action Workplan

The CAP feasibility study is performed to evaluate alternative strategies for remediation and their appropriateness and cost effectiveness. "Feasibility study" and "alternative" are terms that imply comparisons, and so at least two remediation strategies must be evaluated. Each recommended strategy must be capable of achieving the target cleanup goals established or proposed/approved for the site. Each strategy must also be designed to mitigate nuisance conditions and risk of fire or explosion.

In areas where the RWQCB has designated current or potential beneficial uses for groundwater or surface water, or where water is being used regardless of any particular designation, the feasibility study must evaluate at least three corrective action strategies. In areas where the RWQCB has not designated any current or potential beneficial uses for groundwater or surface waters**, t**he feasibility study must evaluate at least two corrective action strategies. At times, circumstances may be such that the "no action" or long-term "passive bioremediation" alternative might be considered suitable for evaluation in the feasibility study.

The elements of a feasibility study include, at a minimum, the following information:

a. A brief description of each proposed corrective action strategy.

b. A brief justification for the selection of each corrective action strategy as an appropriate method to restore or protect existing or potential beneficial uses and protect public health.

c. An estimate of the time required to attain proposed cleanup goals for each corrective action strategy.

d. A comparative analysis of the total costs of each corrective action strategy. Costs should be presented in terms of starting and operating costs. Unit costs and detailed activity lists are not required.

e. A selection of the "most cost-effective" strategy, as determined by the RPs.

f. Preparation of a detailed workplan describing the specific tasks to be performed in implementing the selected remediation alternative. The workplan should address all the relevant items in parts (3), (4), and (5) of the SAM Manual "Site Remediation Check List."

g. Preparation of a Community Health and Safety Plan. A detailed plan of community health and safety must be prepared according to the guidelines presented in Section 4.IV. This document must accompany the workplan.

Note: The workplan is requested to expedite the site cleanup process. However, circumstances may be such that the RPs and/or their consultants may seek DEH concurrence with the proposed corrective action strategy prior to the preparation of a workplan. Contact the assigned DEH staff person to discuss this option.

4. Plan to Monitor and Report the Effectiveness of the Corrective Action

As an integral part of the CAP, the RPs must propose a strategy for monitoring and evaluating the effectiveness of the corrective action strategy.

- Describe the key indicators and the monitoring methods to be used in evaluating the effectiveness of the work.
- Describe the criteria to be used in determining when site cleanup is complete, or when the corrective action has become ineffective.
- Propose a schedule for reporting to DEH, in writing, the monitoring data and an evaluation of the results of such monitoring.

DEH concurrence with the proposed reporting schedule must be obtained before the corrective action is implemented, except as provided in Section C below. During implementation of the CAP, the verification and monitoring program may be modified after consultation with DEH if new conditions deem this necessary.

C. Regulatory Agency Concurrence

The RP must modify the CAP in response to DEH directives. DEH will concur with the final version of the CAP and will issue a "Conditional CAP Concurrence" letter after concluding that implementation of the CAP will adequately protect public health and safety and the environment, and will restore or protect the existing or potential beneficial uses of water. The RP, not DEH, is fully responsible for identifying the most cost-effective corrective action alternative for the site.

If DEH does not respond to the CAP proposal within 60 days of receipt, the RP may notify DEH of their intent to begin cleanup. The RP must comply with any conditions set by DEH at that time, including mitigation of adverse consequences from cleanup activities. DEH can, at any time, direct the RP to modify or suspend cleanup activities.

Before "Final CAP Concurrence" is provided for implementation of the CAP, the RP needs to notify the public of the proposed corrective actions.

D. Public Participation

DEH will require that the RP send a public notice to property owners and occupants of adjacent properties. Additionally, notifications must be sent to those in the vicinity of potential impacts from the site activities, the local planning agency, and other interested parties. The public notice is to describe the proposed CAP and invite interested parties to review the CAP at a local public library and at the offices of DEH. The public participation process must provide a minimum 30-day period for the public to review the CAP and to comment directly to DEH. The public notice must include the information contained in the sample notice found in Appendix D.II.

Prior to initiating the public notice period, the RP will provide to the DEH Project Manager for approval a copy of the notice, the list of persons to be notified, and an additional copy of the CAP and workplan for public review at DEH offices. Upon approval from DEH, the public notices may be distributed. DEH must be notified when the Public Participation process has begun, and be provided, in writing, proof of service of the public notice.

If sufficient public interest is expressed during the public notice period, DEH has the option of holding a public meeting. During a public meeting, the RP and/or their consultants must be

prepared to present the findings and conclusions of their site investigations, as well as their recommended remediation strategies. Based upon the public comments received, DEH may require modifications to the CAP proposal prior to providing final concurrence and allowing CAP implementation.

Note: Public notification is also required after CAP implementation whenever the target cleanup levels are not attained.

E. Verification Monitoring and Verification of Remediation

Verification samples must be obtained to demonstrate the effectiveness of site cleanup, both during and post remediation. The specifics of verification sampling are dependent upon the:

- Amount of investigation conducted during the site assessment phase,
- Remediation process used,
- Type of contaminant,
- Site geology and hydrogeology, and
- Site use.

A verification-sampling plan must be designed in cooperation with the DEH Specialist assigned to the case. For groundwater contamination, periodic samples will be required from monitoring wells. This must continue over a one-year period (at a minimum). Analytical criteria for cleanup verification are the same as those discussed in Section 5.

IV. REMEDIATION BY NATURAL ATTENUATION

Under certain circumstances, DEH will consider Remediation by Natural Attenuation (RNA) as an remediation alternative for petroleum contamination. RNA is a natural process by which contaminants in the environment are slowly degraded or reduced in concentration by various passive means including volatilization, adsorption, desorption, dispersion, dilution, diffusion, biodegradation, and abiotic degradation. With proper monitoring, an RP may use RNA when there is no existing threat to public health, public safety, groundwater quality, or the environment. The RWQCB's Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites, dated April 1, 1996 (Appendix E.IV) should be consulted when considering RNA, because it outlines additional site mitigation criteria in relation to the groundwater basin use.

Aggressive remedial technologies can potentially yield more immediate mitigation of contaminated sites. This guideline is not intended to discourage the use of the best available control or treatment technologies, methods, or practices.

The following Applicability Section describes the conditions that must be shown to exist at a site in order for DEH to consider RNA a viable corrective action strategy, or a single phase of a multi-phase corrective action strategy. The Evaluation Section then outlines the data collection and data evaluation requirements that need to be addressed when RNA is proposed. Finally, the Workplan and Report of Natural Attenuation Processes Sections establish the scope and the content of the monitoring and reporting program.

A. Applicability

For RNA to be considered, the following conditions must be met:

- The release has been assessed to the satisfaction of the DEH Project Manager.
- Sensitive receptors are protected prior to and during the RNA process.
- The primary contaminants of concern are petroleum hydrocarbons that can be shown to attenuate under natural site conditions.
- Sources of existing or potential groundwater contamination have been removed or mitigated to the extent practicable. These include primary sources such as leaking USTs or product pipelines, and secondary sources such as NAPL and soil containing contaminant concentrations that exceed the established cleanup goals.
- Groundwater monitoring data demonstrate a stable or retreating contamination plume to the satisfaction of the DEH Project Manager.

Note: If methyl tertiary butyl ether (MTBE) is identified on the site, contact the DEH Project Manager to discuss the applicability of RNA.

B. Evaluation

The site-specific data needed and the evaluation method must be proposed to DEH in the CAP to justify the use of RNA.

1. Data Collection

Site-specific data are required at all sites where RNA is proposed as a remedial technology. In addition to the Site Remediation Plan Checklist topics, the following information must be included to demonstrate the viability of RNA at a site.

a. General Site Parameters

- Soil type
- Soil contamination (type, magnitude, quantity, and distribution)
- Groundwater depth and gradient (include historical fluctuations)
- Groundwater contamination (type, magnitude, quantity, and distribution)
- Historical date and volume of release (if known)
- Porosity, hydraulic conductivity, transmissivity, groundwater velocity

b. Specific Site Parameters

Specific site parameters are measured to demonstrate the occurrence of RNA. If the primary parameters do not demonstrate the viability of RNA, secondary parameters will be required. It is recommended that the frequency and distribution of measurements allow for time series graphing, site profiles and/or contours.

Primary:

- Benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations

Secondary:

- Dissolved oxygen
- Soluble iron, manganese, nitrate, sulfate, phosphate, bicarbonate, carbon dioxide, methane, pH, and redox

2. Data Evaluation

a. Trends in Site-Specific Data

Because hydrogeologic conditions, (water level, flow direction, gradient, etc.), sampling techniques (purge method, collection apparatus, etc.), and analytical methods may vary, established trends (both spatial and temporal) should be based on long-term monitoring. Possible approaches for evaluating data include cross sections that illustrate historic groundwater levels and analytical data relative to the contaminant source, historic graphs of contaminant concentrations and water levels versus time, and trend analyses of contaminant concentrations temporally and/or spatially.

(1) Temporal groundwater analytical and elevation data are to be plotted on a graph versus time to assess plume status.

(2) Spatial groundwater analytical data are to be plotted on a concentration versus distance graph and on site plot plans.

b. Trends in Indicators

Table 7.1 provides a partial list of chemical constituents and properties that have been used to evaluate the viability of RNA.

c. Models

If preliminary information does not adequately demonstrate that RNA is viable, additional information may be required and modeling may be necessary. Models may be used to evaluate the viability of RNA or to estimate the time required to achieve the cleanup goals.

All sensitive physical parameters required in the model construction and operation must be listed and be site-specific.

d. Innovative Alternative Data Evaluation

Proposals are encouraged that use new/innovative data evaluation methods to evaluate and monitor the effectiveness of RNA. Before an innovative method of data evaluation is begun at a site, the justification for the proposed methodology must be discussed with the regulatory agencies. A workplan for the use of an innovative data evaluation method must be submitted to the regulatory agencies for review and approval. The workplan must include the following minimum information:

(1) Technical basis and merits of proposed new/innovative data evaluation method

(2) Specific attenuation processes that the methodology is intended to monitor and evaluate

(3) Technical references to support the validity and sensitivity of the proposed data evaluation method(s).

C. Workplan

The workplan should propose a monitoring and reporting plan to evaluate the progress of RNA. Specifically, the plan should include:

- Compounds of concern
- Cleanup goals (specific concentration or trend as set in the CAP)
- Data evaluation methodology
- Specific data required to implement the proposed data evaluation methodology
- Site-specific sampling locations and media to be sampled
- Sampling and analytical protocols (including QA/QC limits) required by the proposed methodology
- Frequency of sampling and analysis
- Proposed frequency for the preparation and distribution of the reports and attachments
- Methodology to be used to estimate mass removal rate

TABLE 7-1
SELECTED INDICATORS OF RNA

Indicator	Biodegradation Condition	Evaluation
Dissolved Oxygen (D.O.)	Aerobic biodegradation	Monitor upgradient and in source area. Should see decrease in source area if being utilized.
Nitrate, sulfate, ferric iron, manganese	Anaerobic biodegradation	Instead of oxygen, under anaerobic conditions (no D.O. upgradient or <1 ppm D.O.) there are several possible electron acceptors. Nitrate and sulfate will decrease, as compared to upgradient if they are being used for biodegradation. It is difficult to measure ferric iron. Measure the end product, ferrous iron. In this case, the concentration of ferrous iron will increase in the source area if biodegradation is occurring. Manganese can also be used as an electron acceptor, although it is mostly associated with marine sediments.
Methane	Anaerobic biodegradation	Methane is the end product of the use of carbon dioxide as an electron acceptor. Can be measured by gas chromatography.
Carbon dioxide	Aerobic and anaerobic biodegradation	Carbon dioxide is made under both aerobic and anaerobic conditions. It is the major end product from the biodegradation. It can be measured by gas chromatography or chemical titration.
Eh (Redox potential)	Aerobic and anaerobic biodegradation	An Eh that is positive is indicative of aerobic conditions. An Eh that is negative is indicative of anaerobic conditions. The electron acceptor that is being used under anaerobic conditions can be predicted from the Eh measurement. The measurement of Eh can be difficult.
Ammonia (or nitrate) and phosphate (Nutrients)	Aerobic and anaerobic biodegradation	Biodegradation may be limited under some conditions due to insufficient nutrients for microbial growth. Phosphate and a nitrogen source (ammonia or nitrate) are needed for bacterial growth and can decrease in the source area.
pH	Aerobic and anaerobic biodegradation	Aerobic biodegradation will generally lead to carbon dioxide. Anaerobic biodegradation will lead to both carbon dioxide and other end products, such as volatile fatty acids (acetate, propionate, butyrate). Both can result in acidic conditions and a lower pH.

D. Report of Natural Attenuation Processes

A report must be submitted summarizing the evaluation of the RNA processes. The report should include at a minimum the following:

1. A complete site assessment report
2. Compilation of the data analysis activities to evaluate the RNA process
3. Calculations of the mass removal rate
4. A general estimate of the time it would take to reach the cleanup goal by RNA (if not reached)
5. Conclusions and recommendations.

The report must re-evaluate the efficacy of RNA. The report should summarize previous field and laboratory data and summarize data accumulated during the RNA monitoring period. The final report submitted to DEH must demonstrate that remediation has accomplished its stated goals (as set in the CAP).

A Registered Geologist or Registered Civil Engineer must sign the report.

V. SITE REMEDIATION WORKPLAN CHECKLIST

All remedial activities overseen by or under the direction of DEH must be completed under an approved workplan. The workplan must contain the relevant items in the Site Remediation Workplan Checklist in this Section. If warranted, DEH has the option of approving a verbal workplan. Activities must be performed in accordance with the SAM Manual and in a manner that adequately protects public health and the environment. Additionally, most remediation activities require approval and/or permits from various agencies.

Each of the following topics should be addressed in the proposed workplan for remediation. If any of the topics do not apply to your situation, provide an explanation within the workplan.

A. Site Identification

1. Complete site address and phone number
2. Name and type of business or description of current site use
3. Assessor's parcel number (APN)
4. Property owner's name, mailing address, and phone number
5. RP's name, mailing address, and phone number
6. Consultant's name, mailing address, and phone number
7. Contact person's name, mailing address, and phone number (if different than listed above)
8. DEH case number (i.e., H00000-000)
9. EPA identification/generator number

B. Summary of Site Assessment

1. Characterization of contamination and matrix (e.g., soil, sludge, groundwater)
2. Table of laboratory data
3. Cross sections showing the extent of contamination, sample locations, contaminant concentrations, water table elevation, lithology, location of USTs, piping, dispensers, and other possible contaminant sources
4. Map(s) showing the horizontal extent of contamination, sample locations, contaminant concentrations, groundwater gradient, location of entire UST system
5. Maximum and average concentration of contaminant(s)
6. Estimated volume of contaminant to be treated
7. Estimated volume of matrix to be treated
8. Description of past present and future property uses
9. Map showing adjacent land use(s) (e.g., residential, commercial) drawn to scale, noting schools, hospitals, and any other sensitive receptors within a 1-mile radius of the site
10. Location and use of all known water wells on the site and within a 1-mile radius of the site

C. Treatment System

1. Statement of qualifications of treatment system designer, including past experience(s) using the proposed system on similar contaminants and matrices
2. Treatment system design, type of equipment, and operation specifications
3. Treatment system flow chart and logic control flow diagram
4. Plot plan showing location and arrangement of treatment system on the site
5. Proposed treatment project schedule (time-line)
6. Description of monitoring method and schedule to evaluate treatment system effectiveness and to ensure receptors are protected
7. Hours of operation
8. Sound/noise attenuation, if necessary

D. Remedial Waste Determination

The RP is to evaluate whether the waste generated during remedial activities is a regulated waste.

E. Agencies That Require Permits or Notification

(Include copies of relevant permits and/or applications)

1. For proposed discharges to the environment, contact:

    - RWQCB for all discharges, or potential or existing impacts to surface and/or groundwater
    - Air Pollution Control District (APCD) for all discharges to air
    - Local sewer agency for all discharges to sewer

2. If the proposed activities involve flammable or explosive materials or conditions, the RP should acquire input from the local fire department.

3. If the remedial system requires construction activities, the RP is required to contact local building and planning departments to determine if a building permit is required.

4. If the remedial activities involve the generation or treatment of material determined to be a California regulated or RCRA regulated hazardous waste, the RP is to contact the California EPA for direction.

5. If the remedial activities involve the generation or treatment of material determined to be a RCRA regulated hazardous waste, the RP is to contact the EPA for direction.

6. If the remedial activities involve the installation of wells or a UST, a DEH permit is required.

7. If pesticides are a contaminant of concern, the RP should contact the Department of Agriculture for direction.

8. If asbestos is a contaminant of concern, the RP should contact the APCD for direction.

9. Contact each municipality for grading permit requirements. See Appendix N for contact phone numbers."

F. Management of Remedial Wastes and On-Site Soil Treatment Stockpiles

Refer to Section 5.XI.

G. Verification Sampling Plan

Verification sampling plans may be included as part of the "Remediation Workplan." It should be understood, however, that such plans are preliminary and may need to be modified as a result of site-specific conditions, which may be discovered during remediation. It will be necessary to consult with the DEH Specialist before conducting verification sampling.

H. Community Health and Safety Plan

DEH has the legal authority to halt any remediation project that adversely impacts the public health, public safety, or the environment. Other agencies can halt activities that create a nuisance or fire danger. A Community Health and Safety Plan must be submitted and approved prior to commencement of remediation activity. This will help ensure (but cannot guarantee) that the cleanup will continue uninterrupted. Please refer to Section 4.IV.

VI. MANAGEMENT OF PETROLEUM HYDROCARBON CONTAMINATED SOIL

The following discusses the proper on-site storage controls and the final management options for disturbed petroleum contaminated soils (excavated, graded, cuttings from boreholes, etc.).

A. Engineering Controls for Stockpiled Soil

When contaminated soil is being excavated and stockpiled, the main concerns are the potential impacts primarily to human receptors and secondarily to the environment. DEH recommends that

creation of contaminated soil stockpiles be avoided whenever possible, but understands that there are situations in which these stockpiles are necessary. The following engineering controls should be implemented when contaminated soil stockpiles are created:

1. Place on a relatively impervious surface such as covered asphalt, concrete, or plastic sheeting.

2. Moisten to minimize dust emissions during stockpiling (no runoff is to be created during this process).

3. Construct and maintain the stockpile in a manner that prevents surface and rainwater from entering the stockpile and minimizes vapor emissions.

4. Secure covering with heavy plastic sheeting to minimize vapor emissions and prevent runoff from rain (sheeting must be maintained in good condition).

5. Remove stockpiled soil in a timely manner after excavation to avoid nuisance complaints. Any stockpiled soil demonstrated by sampling and laboratory analysis, or determined by the generator to be hazardous waste, must be stored in accordance with hazardous waste regulations, and removed within 90 days of excavation.

6. Minimum stormwater requirements must be met according to Appendix N.

B. On-Site Management

The RP for the unauthorized release may elect to manage the contaminated soil through on-site treatment and/or on-site disposal. The RP is required to follow the requirements of the RWQCB Resolution No. 95-63 (Appendix E.VII). Sampling should follow the guidance in Section 5.X.A. It is good practice to communicate closely with the assigned DEH Project Manager to avoid any unnecessary delays and/or expenses. Documentation of all implemented on-site soil treatment or disposal activities must be submitted to DEH and the RWQCB.

C. Disposal of Contaminated Soil Outside San Diego County

Contaminated soil to be disposed of or treated at a permitted facility outside of San Diego County must meet the acceptance requirements of that facility. Before soil is transported, DEH must be notified of the disposal location. Documentation of disposal of the soil (i.e., bill of lading, weigh tickets, manifests, etc.) must be submitted to DEH as evidence of proper soil disposal.

D. Disposal of Contaminated Soil at a Class III Landfill in San Diego County

Contaminated soil to be disposed of at a Class III landfill in San Diego County must meet the acceptance requirements of that facility. Prior to soil transport DEH must be notified of the disposal location. Documentation of proper disposal of the soil (bill of lading, weigh tickets, manifests, etc.) must be submitted to DEH.